

Please add the following new claims:

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13. A method of modifying a polymeric substrate comprising exposing the polymeric substrate to a flame where the flame is supported by an oxidizer and fuel mixture that includes at least one sulfur-containing compound that is a gas at room temperature and pressure and functions as a fuel substitute.
 14. The method of claim 13 wherein the mixture of oxidizer and fuel is fuel-lean.
 15. The method of claim 13 wherein the mixture of oxidizer and fuel is fuel-rich.
 16. The method of claim 13 wherein the sulfur-containing compound comprises hydrogen sulfide.
 17. A polymeric substrate having on at least one surface an adhesion-promoting treatment provided by the method of claim 13.
 18. A polymeric substrate treated on at least one surface by the method of claim 13 and having a metal layer adhered to the treated surface.
 19. A polymeric substrate treated on at least one surface by exposing the polymeric substrate to a flame supported by an oxidizer and fuel mixture that includes at least one sulfur-containing compound that functions as a fuel substitute, the polymeric substrate having a metal layer adhered to the treated surface.

Remarks

The above amendments are submitted to assure a clear distinction over U.S. Patent No. 5,900,317, copy attached. The '317 patent was called to applicants' attention in an International Preliminary Examination Report mailed to the undersigned on March 18, 2003. The '317 patent teaches a method for modifying the surface of a polymeric substrate by exposing the surface to a flame, where the flame is supported by a fuel and oxidizer mixture that includes at least one silicon-containing compound introduced into

the flame as a vapor and functioning as a fuel substitute. As stated in column 3, lines 6-14, the silicon-containing fuel substitute rapidly decomposes in a flame to yield silicon atoms or silicon hydrides. In turn, these silicon atoms or silicon hydrides are oxidized to silica in a rapid, essentially irreversible reaction. Silicon-containing structures deposit out of the flame onto the polymeric substrate.

In column 3, line 16, the '317 patent discloses that silylthioethers can be used in the surface-modifying method of that patent. Although silylthioethers include sulfur, the sulfur is contained in a part of the molecule that decomposes, leaving silicon to deposit on the polymeric substrate. There is no teaching in the '317 patent that the sulfur moiety decomposed in the flame can itself modify and provide improved surface properties to the polymeric substrate. Rather it is understood that the silicon-containing deposit provides improved surface properties.

The '317 patent would not lead any person of ordinary skill in the art to seek to modify the surface properties of a polymeric substrate by use in a flame of a fuel substitute that contains sulfur but no silicon. Surface modification using a fuel substitute that contains sulfur but not silicon is nonobvious over the '317 patent. The new claims presented in this submission are directed to such nonobvious subject matter. Specifically, amended claim 1 calls for the sulfur-containing compound to be selected from hydrogen sulfide and a mercaptan (supported at page 5, lines 2-4 of applicants' specification). Neither hydrogen sulfide nor mercaptans contain silicon, and neither is disclosed in the '317 patent.

New claim 13 is directed to a method of modifying a polymeric substrate by use in a flame of a sulfur-containing compound that is a gas at room temperature and pressure. Such a recitation is supported in applicants' specification on page 5, lines 5-7. Silylthioethers are liquids (they are large molecules), not gases at room temperature. Claim 13 patentably distinguishes over the '317 patent because the sulfur-containing compound recited in claim 13 is a gas, whereas the silylthioethers taught in the '317 patent are liquids.

A particular advantage of the present invention based on use of sulfur-containing compounds is an improvement in metal adhesion to the treated surface (see applicants' specification, sentence bridging pages 2 and 3 and page 3, lines 26-28). The '317 patent

does not suggest the application of metal to a treated surface of that patent. New claim 19 (essentially original claim 6 written in independent form) is directed to treated substrates having a metal layer on the treated surface, and such articles are not taught in the '317 patent.

The above amendments thus assure that there is no overlap between the claimed subject matter and the disclosure of the '317 patent. Further, nothing in the '317 patent would lead to methods or articles such as covered in the new claims.

Please charge the fee for requesting continued examination under 37 C.F.R. 1.114, as called for in 37 C.F.R. 1.17(e), and any other necessary fee, to Deposit Account No. 13-3723. One copy of this sheet marked "Duplicate" is also enclosed for convenience in handling payment.

It is accordingly believed that this application is in condition for allowance, and a notice to that effect is respectfully solicited.

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Respectfully submitted,

By

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Version With Markings to Show Changes Made

In the following amendments, additions have been identified by underlining and deletions have been indicated by [bracketing].

Claim 1 has been amended as follows.

1. (Amended) A method of modifying a polymeric substrate comprising exposing the polymeric substrate to a flame where the flame is supported by an oxidizer and fuel mixture that includes at least one sulfur-containing compound that functions as a fuel substitute, the sulfur-containing compound comprising hydrogen sulfide or a mercaptan.